Tamarillo

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Scientific Name and Introduction: The tamarillo or "tree tomato" [*Cyphomandra betacea* (Cav.) and renamed by Sendtner to *Solanum betaceum* (Cav.)] is a fruit-bearing subtropical tree that belongs to the Solanaceae family. Fruit are smooth-skinned, oval-shaped, berries capped with a calyx and stem. The three main fresh market types are based on peel and pulp color: red, dark-red and yellow. The mucilaginous, juicy, seedy pulp has a sweet-acid taste reminiscent of the tomato, and the fruit are sometimes eaten raw, but usually cooked. Tamarillos can be produced in California, but most dark-red tamarillos in U.S. markets are imported from New Zealand.

Quality Characteristics and Criteria: Fruit should be firm and heavy, with no decay or discoloration. Color should be characteristic of the variety. Good quality tamarillos are juicy when ripe with a moderate sugar content (8 to 10%) and high TA of 1 to 2%.

Horticultural Maturity Indices: The best maturity index for tamarillo is peel and pulp color. Other indices correlated with skin color are changes in firmness, juice content and SSC. For dark-red skinned types, which progress from green to dark-purple (color due to chlorophyll and anthocyanins) to red, harvesting at the dark-purple skinned stage is considered best. If fruit are harvested green, flavor score, juice content, SSC, and color of ripened fruit are inferior to those of fruit harvested at the dark-purple stage (El-Zeftawi et al., 1988; Heatherbell et al., 1982).

Grades, Sizes and Packaging: There are no U.S. grade standards. Fruit are typically packed into 4 to 5 size categories in tray packs in single cartons.

Pre-cooling Conditions: Room-cooling to storage temperature appears to be the only way tamarillo fruit are pre-cooled. No guidelines are available regarding maximum allowable cooling delays.

Optimum Storage Conditions: Tamarillo fruit can be stored for 4 to 8 weeks (plus an additional week for marketing) at 3 to 4.5 °C (37.4 to 40 °F) with 90 to 95% RH (Harman and Patterson, 1982). Chilling injury occurs if fruit are stored below 3 °C (37.4 °F) and fungal decay occurs on the stem and calyx if stored above 4.5 °C (40 °F). Storage at 7 °C (44.6 °F) was superior to storage at 0 °C (32 °F) for 35 days, with more discoloration of the calyx and stem at 0 °C (32 °F), but more decay and firmness loss at 7 °C (44.6 °F) (Espina and Lizana, 1991).

Controlled Atmosphere (CA) Considerations: None at this time.

Retail Outlet Display Considerations: Fruit should be kept cool and dry throughout marketing.

Chilling Sensitivity: Tamarillos are sensitive to chilling injury if stored below 3 °C (37.4 °F). Symptoms include pitting and a scald-like browning of the skin, calyx and stem. Discoloration on the peel is observed within 15 days of storage at 0 °C (32 °F) (Espina and Lizana, 1991).

Ethylene Production and Sensitivity: Ethylene production is very low at < 0.1 μL kg^{-1} h^{-1}, until fruit begin to senesce (Pratt and Reid, 1976). Green and partially-ripe fruit respond to ethylene with increased respiration (Pratt and Reid, 1976) and accelerated red color development (Prohens et al., 1996). Green fruit,

however, have less color development and lower a SSC/TA ratio when ripe than fruit harvested partially-ripe (Prohens et al., 1996).

Respiration Rates: The respiration rate is 18 to 36 mg (10 to 20 µL) CO_2 kg^{-1} h^{-1} at 18 to 20 ºC (64.4 to 68.0 ºF). Heat production is 3,960 to 7,920 BTU per ton per day or 1,098 to 2,196 kcal per metric ton per day. Data are from Pratt and Reid (1976) and Espina and Lizana (1991).

Physiological Disorders: Viral diseases attacking tamarillo plants may cause mottling on the fruit surface.

Postharvest Pathology: Decay is the single most important cause of postharvest losses in tamarillo. The most common storage decays are due to bitter rot caused by *Colletotrichum acutatum* and *C. gloeosporioides*. This fungus attacks fruit on the tree, but decay does not develop until fruit start to ripen or are stored for several weeks. A good orchard control program with postharvest applications of fungicides can control disease development (Blank et al., 1987). Hot water dips of 50 °C (122 °F) for 10 min, followed by waxing are also effective (Yearsley et al., 1988). With good decay control measures, storage-life may be extended to 10 to 12 weeks at 3.5 °C (38.3 °F) (Harman and Patterson, 1982).

Quarantine Issues: None.

Suitability as Fresh-cut Product: No current potential.

Special Considerations: None.

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